is compressive stress and said layer of conductive interconnectors is sandwiched between two insulating layers having compressive stress.--

REMARKS

A petition for a one month extension of time is transmitted herewith.

The independent claims are now limited to a method wherein at least three conductive layers are sandwiched between and in contact with insulating layers having the same type of stress as shown, for example, in Fig. 10A of the drawings. For an additional discussion of support or description of the invention as now claimed the examiner is referred to the remarks which accompanied the Preliminary Amendment filed November 17, 1999.

As taught at page 7, lines 5-8 and at page 11, line 20 to page 12, line 5, applicants' values for stress represent the overall stress for all layers of the laminate. Further, applicants teach that their values for stress depend upon the thickness of the insulating film. See page 7, lines 13-16. Stress in dyne/cm as a function of laminate thickness is shown in Fig. 10B.

The rejection under 35 USC 103 over the newly cited Matsuura et al reference is respectfully traversed. As taught at column 3, lines 12-25 of Matsuura et al, the first stated objectives relate

to adhesion between an interlayer insulating film and a conductor pattern. As further described at column 4, lines 62 - column 5, line 7 the "inventive method" of Matsuura et al involves formation of a "silicon oxide film deposited by the atmospheric pressure CVD [which] is hereinafter referred to as TEOS-APCVD oxide film," quoting from column 5, lines 3-5. As further explained at column 5, lines 8-19 the TEOS-APCVD oxide film (deposited by atmospheric pressure CVD) "discharges almost no moisture" and, accordingly, "the second layer conductor 18 adheres securely to the interlayer insulating film 14 to secure the coverage of the side wall of the contact hole 17." The TEOS-APCVD oxide film formed by the "inventive method" of Matsuura et al should not be confused with the prior art silicon oxide film formed by plasma CVD and described at column 1, lines 21-32 as a "TEOS-PCVD oxide film". In the case of the prior art film 3 described at column 1, lines 21-32 of the reference, "PCVD" stands for "plasma chemical vapor deposition" which, as taught there, is conducted under a "pressure of several Torrs." In contradistinction, the insulating film of the "inventive method" of Matsuura, i.e., "TEOS-APCVD" oxide film is so named to refer to the atmospheric pressure chemical vapor deposition ("APCVD") by which it is formed. As described at column 4, line 62 to column 5, line 19, formation of the "TEOS-APCVD oxide film" is formed at atmospheric pressure without a plasma.

At column 8, lines 42-55 Matsuura et al contrast their inventive TEOS-APCVD oxide film with the "normal TEOS oxide film"

and other films in terms of discharge of moisture and the improved adhesion which results from the fact that the film of their "inventive method" does not discharge moisture, whereas the normal TEOS oxide film and other prior art films do discharge moisture.

It should be noted that the TEOS-APCVD oxide film resulting from the "inventive method" of Matsuura et al has tension stress as is taught at column 7, lines 6-8.

At the top of page 3 of the office action the examiner characterizes the embodiments of Figs. 1A-1E, 5A and 5B as including the step of "forming a first compression stress insulating layer over and in contact with the first aluminum conductive interconnection layer." While the examiner's statement is true with regard to the embodiment of Figs. 5A and 5B, it is not true with regard to the embodiment of Figs. 1A-1E. In the latter embodiment the first conductive layer 12 is covered with a layer of insulating film 14 which is a TEOS-APCVD oxide film having tension stress. Again refer to column 7, lines 6-8.

At the bottom of page 3 of the office action the examiner acknowledges that "Matsuura does not show wherein the aluminum conductive interconnection layer is sandwiched between and in contact with the insulating films stressed compressively." Nevertheless, the examiner asserts that such a structure and the method producing such a structure "would have been obvious to one

of ordinary skill in the art at the time the invention was made... since this would require duplication of essential working steps of ..." Thus, the examiner points to no motivation in the teachings of the reference itself but, rather, invokes a "boilerplate" type rule to the effect that "duplication of essential working steps" is obvious. It is respectfully submitted that such boilerplate rules no longer provide a legally permissible basis for a *prima facie* case of obviousness. The modern rule is that the reference teachings must somehow motivate one skilled in the art to make the modification of a prior art embodiment which is necessary to arrive at the claimed subject matter. Again, there is no such motivation in the teachings of Matsuura et al.

The case for non-obviousness is even stronger here. Matsuura et al specifically teach how they would fabricate an embodiment with multiple layers of conductor patterns. In 6A they disclose an embodiment including a first layer of aluminum alloy wire 34 and a second layer of aluminum alloy 36. Note that the conductor layers 34 and 36 share in common a single insulating layer 35. In contradistinction, the process as defined by claim 33 necessarily results in a structure wherein three distinct insulating layers are present between adjacent conductor layers, i.e., adjacent conductor layers would be separated by a structure B-A-B, wherein A is a layer with the first type of stress and B is a layer with the second type of stress. In this sense, the only teachings of Matsuura et al relevant to structures including multiple conductive

layers, lead away from, not toward the present invention. Parenthetically, the embodiment shown in Fig. 6A coincides with the wording of the claims of Matsuura et al which are limited to "forming an interlayer insulating film for mutually insulating a first layer and a second layer of conductor patterns..."

In conclusion, it is respectfully requested that the examiner reconsider the rejections of record with a view toward allowance of the claims as amended.

Respectfully submitted,

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